Beyond Keynes and the Classics.
Outline of the Goods Side/Money Side Model of the Business Cycle and Macroeconomic Configurations

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Abstract

This paper presents the goods side/money side (GS/MS) model as a novel way of macroeconomic analysis. The GS/MS model goes beyond Keynesianism as it makes a sharp distinction between the goods side and the money side and thus avoids the indistinctness between real nominal values that come with spending in aggregate demand models. The GS/MS model transcends classical macroeconomics in its traditional and modern versions as it reinstates money as an active factor in the economy. Different from monetarism, the key monetary concept of the GS/MS model is "macroeconomic liquidity", which includes velocity of circulation. The present paper presents the basic features of the GS/MS model and shows its use by analyzing macroeconomic configurations, the business cycle, and economic growth. The paper includes an appendix with an evaluation of macroeconomic configurations in the light of the GS/MS model.

Key words: GSMS macroeconomic model, monetary policy, economic growth, Austrian theory of the business cycle (ATB)

JEL Classification: A23, E32, E52

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1 Introduction

Uneasiness with conventional macroeconomics has been rampant long before the current crisis. The financial crisis of 2008 only highlighted once again the frustration with the state of macroeconomics. The ambiguities of ISLM model have already plagued its originator (Hicks 1980/81) and its extension to the aggregate supply and demand model (AS/AD) has not removed the inconsistency of the standard model (Colander 1995). Despite the deficiencies of ISLM-AS model, it continues to serve as the main workhorse of macroeconomic analysis both inside and outside of academia. The reason is mainly the lack of an alternative model. The ISLM-AS model continues to live by default. The need is widely felt to gain a model that is simple enough for the classroom, yet also sufficiently sophisticated for advanced studies and empirical investigation.

The goods side/money side (GS/MS) model provides a vehicle that applies a sharp distinction between monetary and real variables and avoids the vagueness as to the real and nominal effects that come with the concepts of "spending" or "aggregate demand". The GS/MS model goes beyond monetarism in its use of the equation of exchange. The main function of this macroeconomic model is to show the links among the main parts of the economy. As such, the GS/MS model serves as a guide for teaching and research. The model also offers a framework for the critical discussion of economic policy concepts.

2 Outline of the GS/MS model

The quantity theory of money forms the basis of the present approach. This theory goes back beyond Fisher (1911) Friedman (1956), Hume (1752) and the school of Salamanca (Soto 2012) to the 16th century (Copernicus 1526). Over time, the quantity theory of money has experienced its own cycle with highs, downs and persistent comebacks, particularly after when declared as dead. The quantity theory relates money (M) to national income (Y) and transactions (T) and links these variables with the concept of velocity of circulation (V) or cash balance (k).

In distinction to the Chicago/Fisher transaction version

$$M \times V = P \times T$$

and the Cambridge/cash balance/income version

$$M = kPYr$$

Evans and Thorpe (2013) identify

$$M = kPT$$

as the Austrian version as found in the writings of Ludwig von Mises (1912/1971), while Howden (2013) redefines the quantity theory of money more narrowly as "monetary exchange theorem of velocity".

For the approach that will presented here, however, following Hayek (Hayek 1933/1975, Hayek 1983, p. 100), the model makes the fundamental distinction between the "goods side" (GS) and the "money side" of the economy. As such, the basic equation for the GS/MS model becomes

$$\frac{MV}{P} = Q$$

The GS/MS model distinguishes between the "goods side" (GS) and the "money side" (MS) of the economy based on a reformulation of the equation of exchange to separate the monetary variables from the variables for real production, so that the "monetary side" ($\frac{MV}{P}$) emerges in distinction from the "goods side" (*Q*).

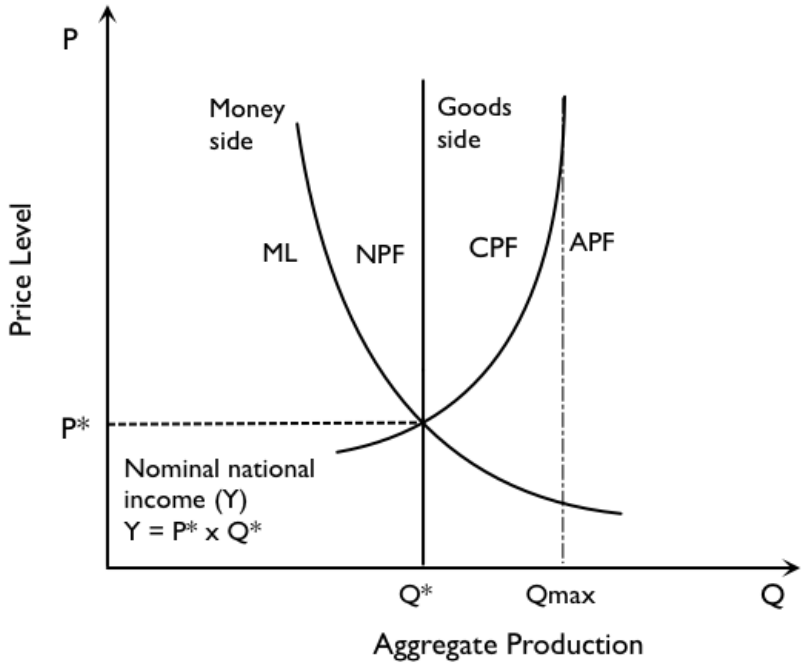
With a fixed money supply and a constant velocity, the relationship between prices (P) and product (Q) forms a hyperbola as

$$f(q) = \frac{1}{p}$$

In its graphical representation (curve ML in figure 1), the stock of money in circulation represents macroeconomic liquidity (*ML*) and is composed of money as a means of payments (*M*) multiplied by its income velocity (V). In the GS/MS model, "money" signifies means of payments and is not identical with the so-called "true money supply" of Austrian economics (Salerno 1987). "Macroeconomic liquidity" (*ML*) as used in the GS/MS model represents the supply of money as a medium of exchange and includes

velocity of circulation. As such, macroeconomic liquidity reflects the actual use of money in the economy.

Figure 1
Standard goods side/money side (GS/MS) model



Different from the Garrison model (Garrison 2000), the goods side here shows the natural production frontier (*NPF*), which represents the normal or regular output at the given state of the factors of production, while the cyclical production frontier (*CPF*) represents current output in terms of capacity utilization or degrees of scarcities. The more current production moves beyond the natural production frontier and the more it approaches maximum output at the absolute production frontier (*ABS*), the more scarcities increase and, in monetary terms, costs will augment and prices rise.

Given that nominal national income (*Y*) is equal to real production (*Q*) multiplied by the price level (*P*), nominal income is the rectangle of the area with the price level and production as its sides. In order to capture nominal national income, the basic model experiences an extension in the form of

$$M \times V = Q \times P = Y$$

A further extension of the equation by the components of expenditures for consumption (C), investment (I) and government (G) and the external sector reveals how the standard Keynesian analysis relates to the money side and the goods side of the economy.

$$Q \times P = Y = C + I + G = P_C \times Q_C + P_I \times Q_I + P_G \times Q_G + P_{EX} \times Q_{EX} - P_{IM} \times Q_{IM}$$

Likewise, the left side of the basic equation extends in order to include the sources of liquidity. Macroeconomic liquidity (*ML*) in the money side of the equation is the result of the monetary base (*MB*) multiplied by the financial market or banking multiplier (m_b) and the velocity of circulation (*V*).

$$ML = MB \times m_b \times V$$

At this stage, the macroeconomic story to tell includes taking account of money, prices and goods that begins with the monetary base and continues with the structure of production.

$$BM \times m_b \times V = Q \times P = Y = C + I + G = P_C \times Q_C + P_I \times Q_I + P_G \times Q_G \ldots$$

In terms of actors and decisions, the equation contains, beginning at the left and moving to the right, the central bank, which decides on the monetary base, the actors in the financial market, which determine the banking multiplier, and all those economic agents, which decide about cash holdings. At the right side of the equation, the black box of overall production (*Q*), price level (*P*) and nominal national income (*Y*), opens up in terms of relative prices, such as P_C/P_I or P_I/P_Q, and so on at the level of intermediate aggregation. In detailed form, the extension of the model beyond the intermediate aggregation in terms of consumption, investment and government, and the addition of the external sector, would lead to the analysis of the structure of production.

The GS/MS model makes a distinction between a "natural" and a "cyclical" production frontier (NPF and CPF respectively in figure 1). The distinction between the normal or regular course of affairs and exceptional business activity either beyond or below this level is fundamental to the conduct of a firm. The more economic activity approaches the limits of capacity, the more costs will rise as the result of increasing

scarcity, and the more it will be necessary to obtain higher prices in order to maintain profitability. Likewise, when activity falls below its normal level, unused capacity exist and competition drives down prices. Different from the cyclical production frontier (*CPF*), which indicates the variation of current production in relation to the price level, the natural production frontier (*NPF*) is independent of the price level and shifts according to changes of the quantity and quality of the factors of production.

3 Dynamics of the GSMS model

The GS/MS model is composed of the money side (*MS*), and the goods side (*GS*) with the differentiation between the natural production frontier (*NPF*), the absolute production frontier (APF), and the cyclical production frontier (*CPF*).

The dynamic version of the equation of exchange reads as:

$$g_M + g_V = g_Q + \pi$$

Given that macroeconomic liquidity (*ML*) is composed of money multiplied by its velocity, the equation becomes

$$\pi = g_{ML} - g_Q$$

In this reduced form, price changes result from the relationship between growth of liquidity and real economic growth (g_{ML} - g_Q), while when applying the determinants elaborated above, the equation for price inflation becomes:

$$\pi = (g_{MB} + g_{m_b} + g_v) - (g_{Q_n} + g_{Q_c})$$

For price stability with an inflation rate of zero *(π=0)*, the condition is:

$$(g_{MB} + g_{m_b} + g_v) = (g_{Q_n} + g_{Q_c})$$

The rate of unemployment is inverse to economic expansion, i.e. to cyclical growth, while natural economic growth (shift of the NPF-curve to the right) comes with steady employment or an employment rate that remains at its natural level (u_n). Therefore,

the current unemployment rate (u_t) is a function of cyclical economic activity ($g_{Q_c)}$), while the natural unemployment rate (u_n) coincides with the natural production frontier (*NPF*). Finally, nominal national income (*Y*) is the product of real production and the price level, or, specified by the model, its growth rate (g_Y) is:

$$g_Y = g_Q + \pi = g_{Q_n} + g_{Q_C} + \pi$$

These equations provide the tools to compose a table of macroeconomic constellations composed of the variables that show up in the set of the basic equations of the GS/MS model. These macroeconomic constellations, which show up in the table (see table 1 in the appendix) as shifts of the natural and cyclical productions functions along with the curve for macroeconomic liquidity, have at their basis potential and actual changes of the variables as determined in the extended dynamic equation of exchange.

$$\pi = (g_{MB} + g_{m_b} + g_v) - (g_{Q_n} + g_{Q_c)}$$

The GS/MS model serves to identify specific macroeconomic configurations and to orient their analysis. The tables and graphs in the Appendix show the variables of the model in order to analyze the links among the different parts of the macro-economy.

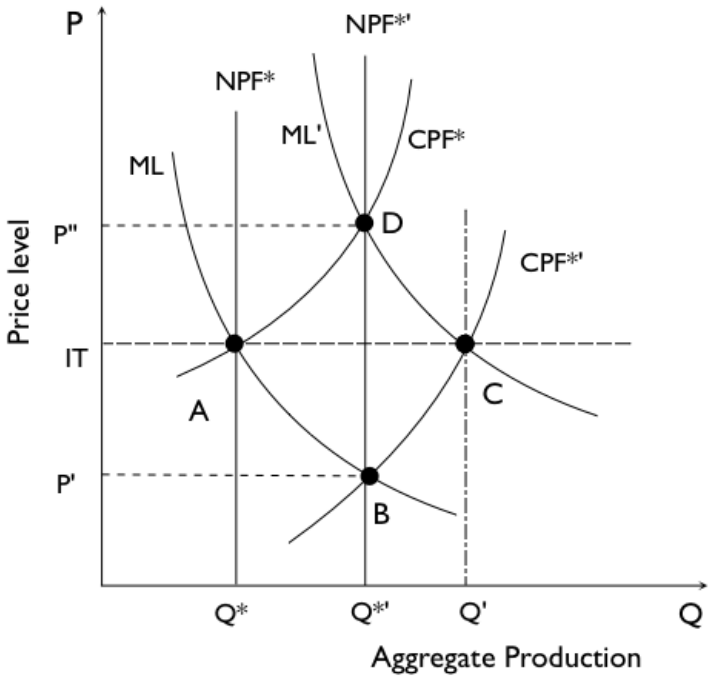
4 Business Cycle Analyses

The academic discussion of the Austrian theory of the business cycle has suffered from many misunderstandings and outright false claims (Block and Barnett 2008). More recently, however, serious interest in the Austrian approach to the business cycle is growing (Cachanosky and Salter 2013) as well as in Austrian economics in general (White 2012). The following graph (figure 2) presents a sequential analysis of the business cycle in the context of the GS/MS model that incorporates some of the crucial points advanced by scholars of the Austrian tradition.

The GSMS model shows that without monetary intervention, increases in productivity would lead to deflationary economic growth (move from point A to B). Such an expansion would come with a higher purchasing power of money. However, when monetary authorities bring about an inflationary boom as they try to maintain “price

stability" due some explicit or implicit inflation target (IT), they produce an unsustainable expansion. An increase of macroeconomic liquidity (ML) moves economic activity beyond the natural production frontier (C). Economic activity that exceeds the natural level ($Q'>Q^*$) will raise production prices as consequence of higher degrees of scarcity and show up as higher prices in line with the amount of macroeconomic liquidity.

Figure 2
GS/MS model of the business cycle



In due course, the cyclical production frontier, which otherwise would have fallen, moves back in direction towards its original position (*CPF**). At this stage, the hidden monetary inflation turns into open price inflation as the economy moves towards stagflation (D).

The inflationary boom that turned into a bust comes with an overhang of bad debts. When central banks try to re-inflate in the face of the deflationary contraction of liquidity, they actually commit the error again that marked the inception of the cycle. Warding off beneficial productivity-led deflationary economic growth instigated the inflationary boom (move from A to C in figure 2). Now, when the bust has come, monetary policy confronts malicious deflation as a contraction of liquidity and not due to productivity gains. Things get worse in the bust, when monetary authorities hamper the swift

elimination of the recession by endeavors to re-inflate the economy. This way, they make the economy to remain stuck in deflationary depression after the return to point A (figure 2). The natural way out would be to allow the economy ending the deflationary cycle with a move to point B towards a recovery marked by rising output and falling prices.

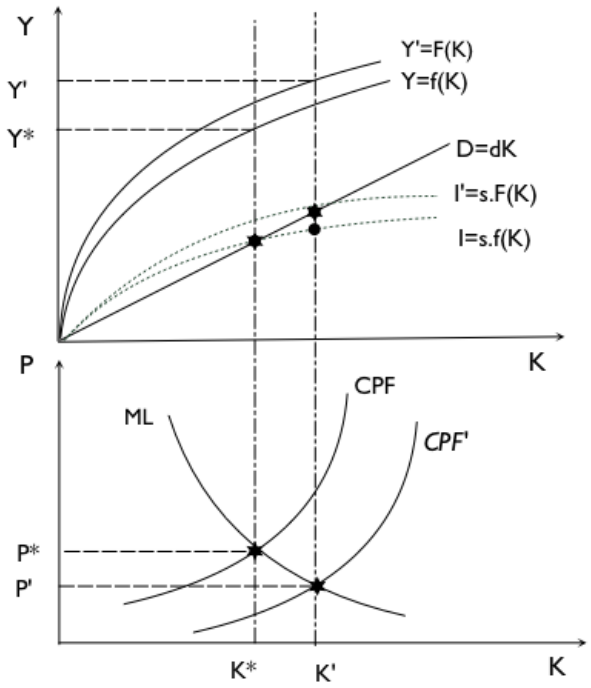
5 Economic growth

5.1 Sustainable economic growth

In terms of the GS/MS model, "natural economic growth" represents the dynamic equilibrium of the system. Productivity-led deflationary economic growth develops in a slow manner and allows the continuous adaptation of expectations. In contrast to this "beneficial deflation", a "malicious depression" represents a slide into a deflationary depression as consequence of a preceding inflationary boom that typically takes place as a collapse compressed in a short time span. The unexpected collapse of liquidity disrupts economic contracts in nominal terms and leaves no sufficient time for revision.

The graph below (figure 3) connects the GSMS model with the standard Solow economic growth model (Solow 1987).

Figure 3
Sustainable economic growth as productivity-led deflationary expansion



The production function shifts upward, which will lift the savings-curve to a level that is in concordance with the requirement of capital maintenance. When monetary conditions remain steady, economic growth comes along with price deflation. The cyclical production frontier moves lower, while the natural production frontier, in concordance with steady state, moves to the right in the model.

The neoclassical economic growth model assumes diminishing marginal returns of capital (K) while the rate of depreciation (*D*) or rather capital maintenance by the understanding of Austrian economics, is positive-linear ($D = dY$). Given an unchanged quantity of labor and absence of technologial progress, income (Y), which in the absence of price changes is equal to the product (Q) becomes a function of capital which is equal to product Q.

Natural economic growth happens when current consumption is less than production and when savings as this residual become investment. Gross investment includes the cost for capital maintenance (depreciation), while net investment consists of a part that represents accumulation of capital (capital enlargement) and the other part that goes into roundaboutness. Roundaboutness extends the capital structure in order to make it more productive. With roundaboutness, higher productivity means more capital can be accumulated which in turn renders a higher income and thus generates more savings. Rising savings permit the maintenance of the higher capital stock, which comes as the result of roundaboutness. In the Solow-Swan growth model, all savings go into capital maintenance when the economy is at steady state. Roundaboutness, however, means that instead of moving all savings into capital maintenance, part of the savings will go into extending the structure of production. With more economic activity going into "roundaboutness", the maturation period from the inception of the project until it becomes a full-fledged consumption good will rise. This way, roundaboutness depends on time preference, which in turn is a function of currently available funds and of expectations. When the capital extension is successful, productivity will rise.

In the GS/MS model, economic growth is "endogenous" in the sense that it is entrepreneurial decision whether to embark upon higher degrees of roundaboutness. Different from concepts such as "innovation" or "technological progress" as exogenous, "roundaboutness" happens as an extension of the capital structure, which leads to higher productivity and in this sense represents "economic progress".

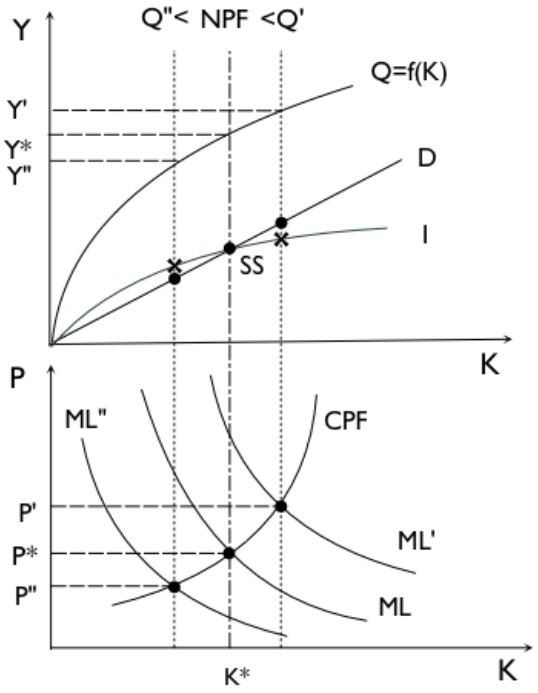
In a pure market economy, relative prices and the regime of profit and loss will regulate the system whose inter-temporal structure rests on time preference. The degree

of time preference defines the division of income between the savings and consumption share and as such, time preference determines the natural interest rate (i_n). This way, the natural interest rate is that interest rate, which reflects time preference and regulates the relative shares of savings and consumption of income. By way of the natural interest rate, time preference determines the appropriate degrees of roundaboutness.

5.2 Unsustainable economic growth

When monetary authorities manipulate the nominal interest rate with the aim to stimulate economic expansion, they fabricate a deviation from the natural rate and deceive economic actors about the prevailing time preference and about the sustainable degrees of roundaboutness (figure 4)

Figure 4
Unsustainable economic growth



A monetary expansion, wich shifts the curve of macroeconomic liquidity from ML to ML' moves real economic activity from Q* to Q' beyond the natural output level (Q*, K*), which determines steady state (SS) in the neoclassical growth model (upper part of figure 4). While at steady state, investment (*I*) is equal to depreciation (*D*), at points to the right of this equilibirum, depreciation exceeds investment because of the lack of sufficient savings ($D > S$) Consequently necessary investments (*I'*) for capital maintenance cannot be achieved. When depreciation exceeds gross investment, net

capital formation becomes negative and the economy will move back to the original equilibirum.

The model reveals that economic stimulus policies must be judged as to whether they are supportive or detrimental to these factors that can counteract the diminishing returns of capital. Deficit spending of government expenditures, for example, does not qualify as a means towards sustainable economic growth because instead of increasing the savings rate, the macroeconomic savings rate would fall with more debt as consequence of deficit spending.

In this version of the GS/MS model (figure 4), deficit spending would at first expand the economy beyond the point of steady state and produce an unsustainable inflationary boom. As consequence, the costs of capital maintenance (depreciation) exceed savings. The expansion will revert. However, the end of the boom would not just move the economy back to the earlier equilibrium, but to a lower level because deficit spending has, ceteris paribus, diminshed the savings rate. Instead of producing economic growth, the policy of deficit spending has led to fall of economic activity below the output level at the inception of the inflationary boom.

6 Conclusion

The GS/MS model provides a powerful tool of macroeconomic analysis that avoids many of the ambiguities of the standard ISLM-AS model. The GS/MS analysis differentiates systematically between expenditures that go into prices and that part, which goes into real production. Concerning macroeconomic policy, the GS/MS model is non-interventionist. By letting beneficial deflation happen, malicious deflation will not show up. The GS/MS highlights the quintessence of the Austrian business cycle theory according to which inflationary economic expansions are the result of monetary stimuli (which includes public deficit spending) that provoke unsustainable booms that revert into busts. While expansionary policy measures function to initiate a boom, they are ineffective in the bust as the deflationary depression is the direct consequence of the earlier inflationary boom and the economy suffers from an overhang of bad debts as the result of misdirected investments. Modern monetary policy fails to differentiate between beneficial deflation as the result of productivity gains and malicious deflation, which comes in the wake of an artificial boom that results in a bust and shows up as contraction

of macroeconomic liquidity. The GS/MS model shows that the natural way of economic progress consists in productivity-led deflationary economic growth

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APPENDIX

Goods side/money side (GS/MS) model didactic toolkit

The tables (table 1 and table 2) provide a sample of typical macroeconomic configurations. One can also capture specific macroeconomic constellations, such as the current Great Recession, which would show up as strong growth of the monetary base, which does not transform into equivalent higher liquidity because of a low banking multiplier and negative velocity. Consequently, the effect of monetary policy on output and prices remains flat.

Table 1

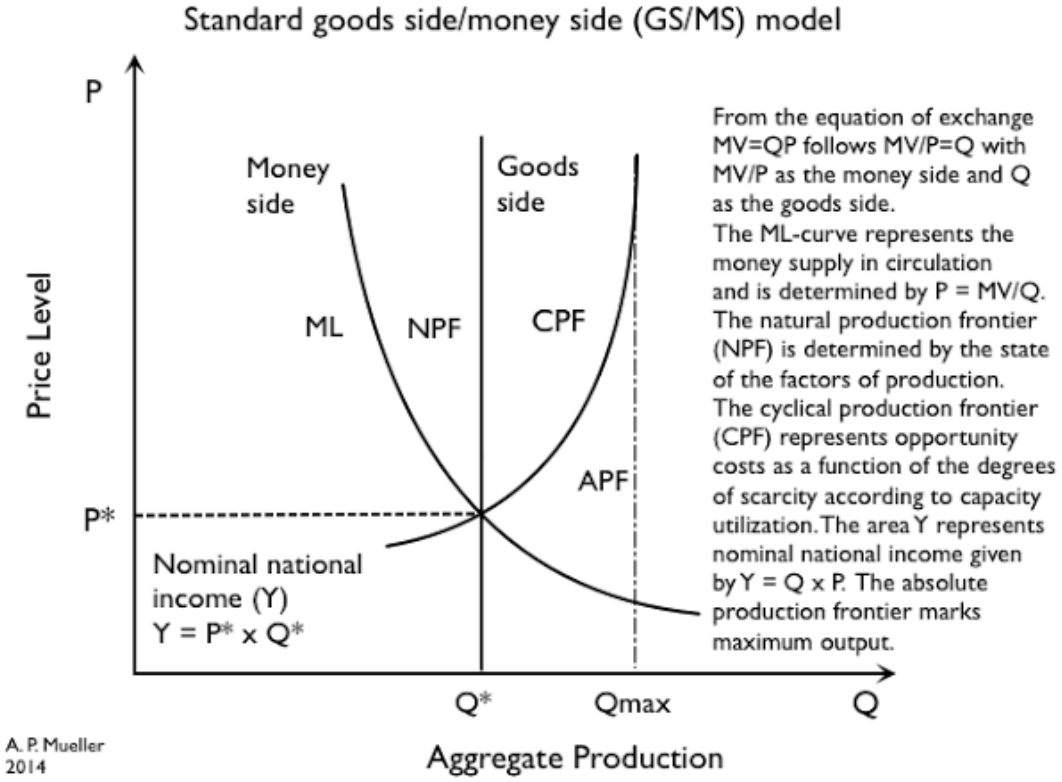
The GS/MS model as a classification tool of macroeconomic configurations

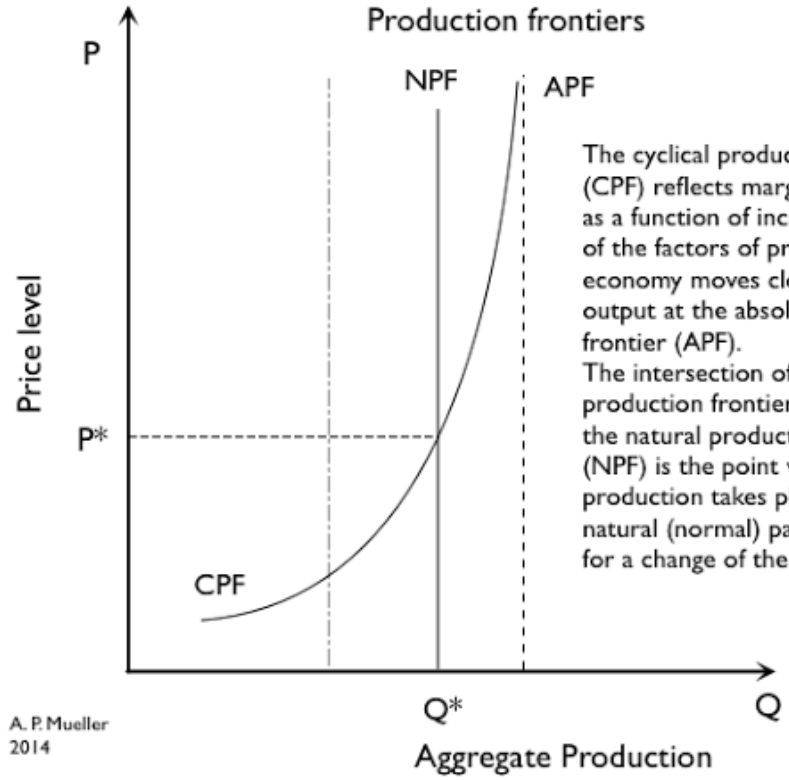
	Macroeconomic liquidity (ML)	Cyclical production frontier (CPF)	Natural production frontier (NPF)
PLG	0	↘	→
MPI	↗	↑	0
MHI	↗	↖	←
MPD	↙	↓	0
DD	↙	↙	←
IS	0	↑	0
IB	↗	↑	0

Table 2
Macroeconomic configurations in terms of the variables of the GS/MS model

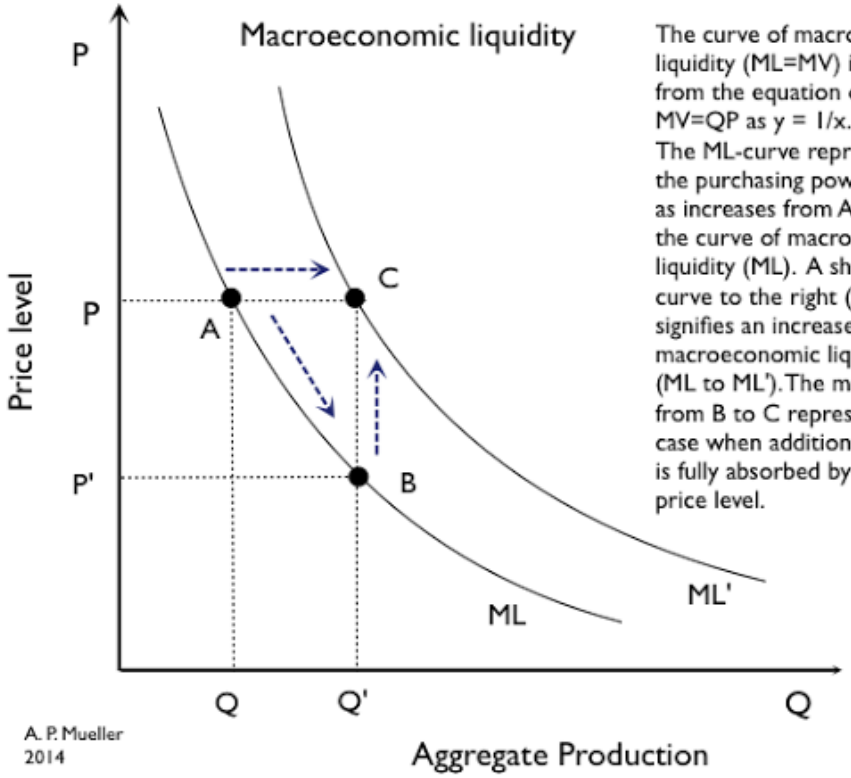
	g_{MB}	g_{mb}	g_V	g_{Qc}	g_{Qn}	π	Q	Y
PLG	0	0	0	+	+	-	+	0
MPI	+	+	0	0	0	+	0	+
MHI	+	+	+	-	-	+	-	+
MPD	-	-	-	-	0	-	-	-
DD	-	-	-	-	-	-	-	-
IS	0	0	0	-	-	+	-	-
IB	+	+	+	+	0	+	+	+

PLG: Productivity-led (deflationary) economic growth – MPI: Monetary price inflation - MHI: Monetary hyperinflation – MPD: Monetary price deflation – DD: Deflationary depression – IS: Inflationary stagnation (stagflation) - IB – Inflationary boom with g: growth rate – MB: Monetary base – mb: banking multiplier – V: velocity of circulation – Qc: cyclical production – Qn: natural production – π: price inflation rate – Q: Current output – Y: nominal national income. The arrows in table 1 indicate direction of the moves of the curves



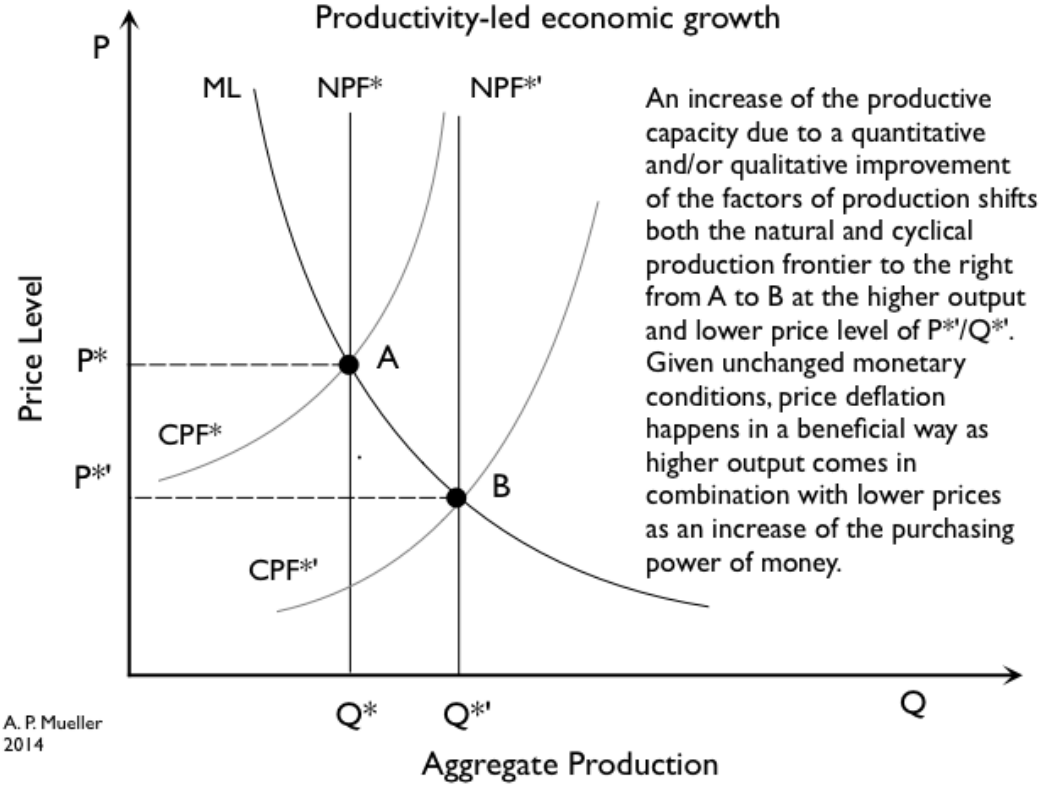


The cyclical production frontier (CPF) reflects marginal costs (MC) as a function of increasing scarcity of the factors of production as the economy moves closer to maximum output at the absolute production frontier (APF).
The intersection of the cyclical production frontier (CPF) with the natural production frontier (NPF) is the point where current production takes place at its natural (normal) pace with no need for a change of the price level.



The curve of macroeconomic liquidity (ML=MV) is derived from the equation of exchange MV=QP as y = 1/x.
The ML-curve represents the purchasing power of money as increases from A to B along the curve of macroeconomic liquidity (ML). A shift of the curve to the right (A to C) signifies an increase of macroeconomic liquidity (ML to ML'). The move from B to C represents the case when additional liquidity is fully absorbed by a higher price level.

Productivity-led economic growth



An increase of the productive capacity due to a quantitative and/or qualitative improvement of the factors of production shifts both the natural and cyclical production frontier to the right from A to B at the higher output and lower price level of P*'/Q*'. Given unchanged monetary conditions, price deflation happens in a beneficial way as higher output comes in combination with lower prices as an increase of the purchasing power of money.

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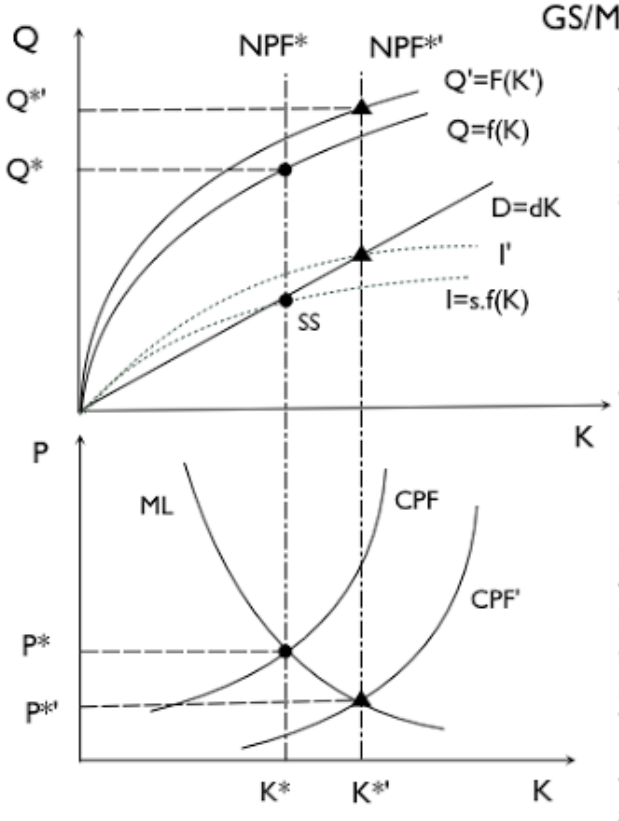
GS/MS growth equilibrium



The upper part of the graph represents the condition of steady state acording to the neoclassical growth model at constant labor and given tecnology. Modifying the GS/MS model by sustituting output (Q) for capital (K), shows steady state identical to the natural production frontier (NPF). In this model, technological progress (higher productivity) would shift the cyclical production frontier (CPF) down and and the production function up together with the investment curve (I) and thus establish a new steady state/NPF equilibrium.

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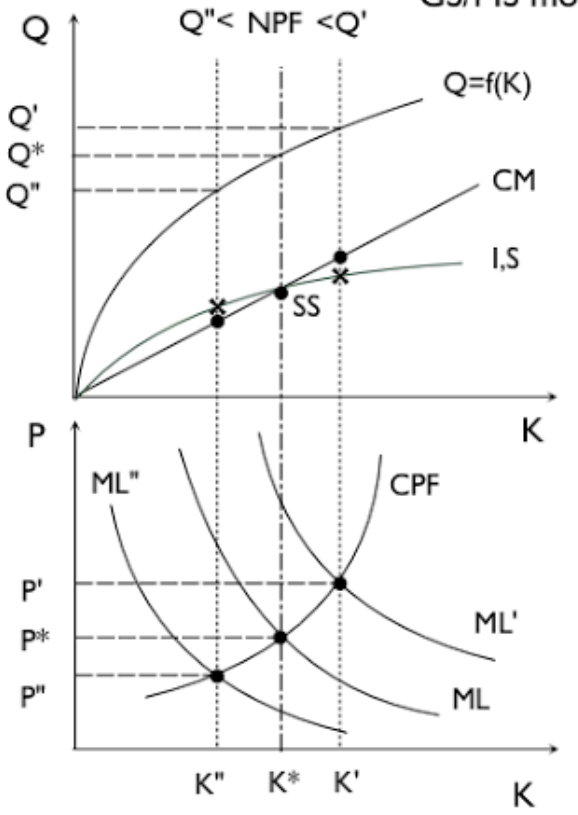
GS/MS model of the business cycle



A monetary expansion (shift of ML to ML.''), which moves the economy beyond the point of its natural level of output (NPF) is unsustainable because at Q'/K' savings (S) are insufficient relative to the funds necessary for capital maintenance (CM). With actual investments (I) falling short of necessary investment, the economy's capital stock (K) will shrink and output contracts because at the (unsustainable) output level of Q', there is less yield per unit of capital than would be necessary in order to generate sufficient savings and investment. In the case of a deflationary contraction (ML") output falls below the natural level (Q"<NPF*). As at this point savings exceed depreciation, an automatic recovery can begin.

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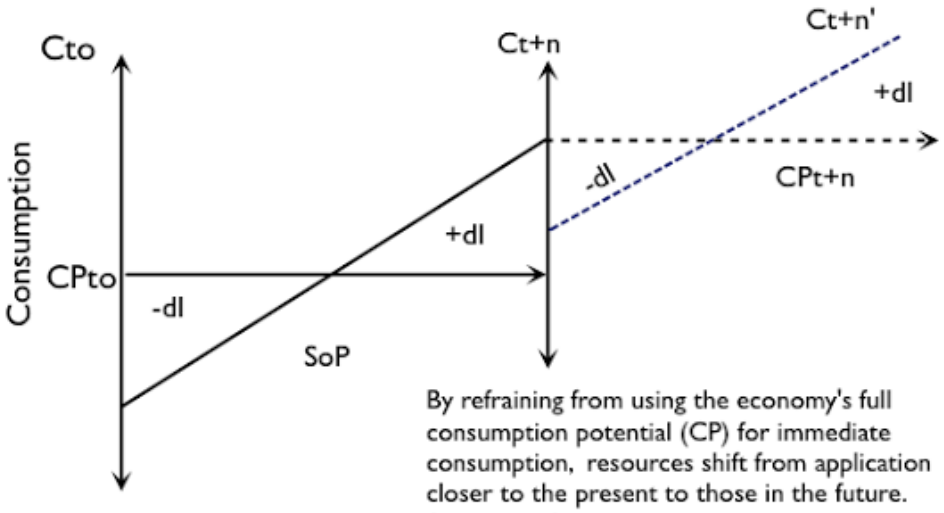
Economic growth dynamics



By refraining from using the economy's full consumption potential (CP) for immediate consumption, resources shift from application closer to the present to those in the future. (- dl to + dl).
This roudaboutness prolongs the structure of production (SoP) and allows step by step the attainment of higher consumption levels.

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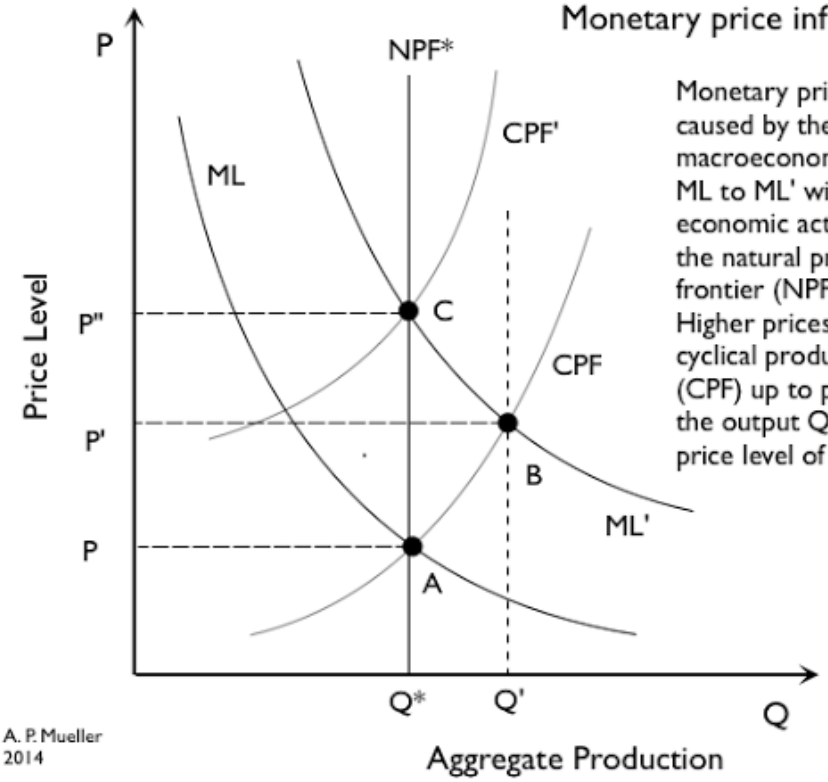
Monetary price inflation



Monetary price inflation is caused by the expansion of macroeconomic liquidity ML to ML' with a move of economic activity beyond the natural production frontier (NPF) from A to B. Higher prices push the cyclical production frontier (CPF) up to point C back to the output Q* at the higher price level of P".

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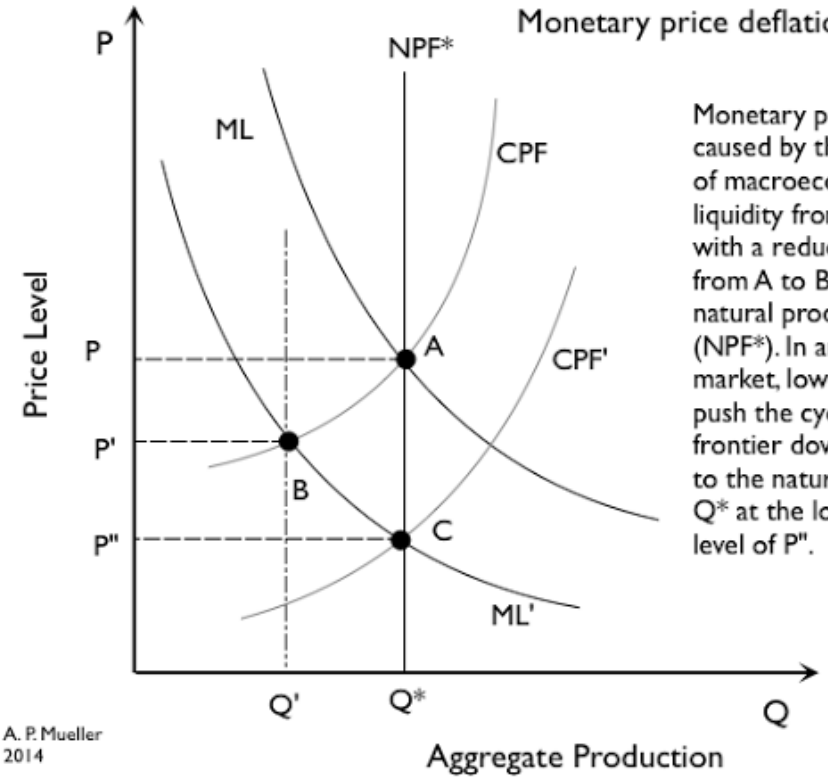
Monetary price deflation



Monetary price deflation is caused by the contraction of macroeconomic liquidity from ML to ML' with a reduction of output from A to B below the natural production frontier (NPF*). In an unhampered market, lower prices will push the cyclical production frontier down to C back to the natural output of Q* at the lower price level of P".

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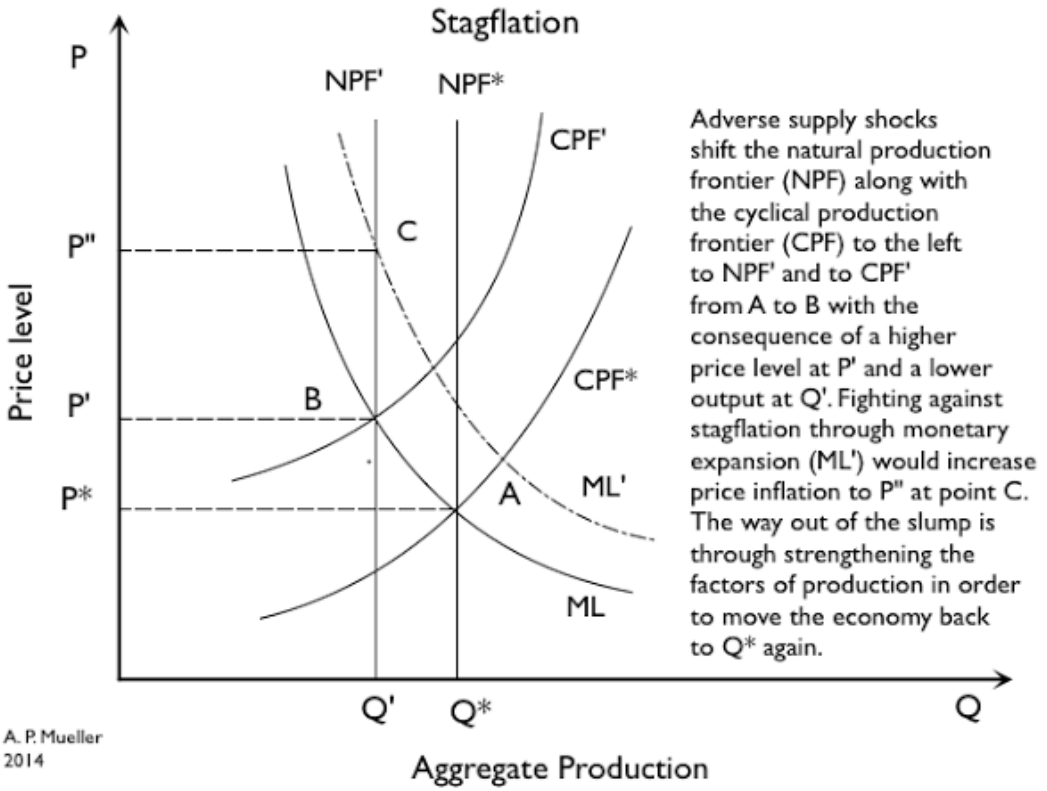

Adverse supply shocks shift the natural production frontier (NPF) along with the cyclical production frontier (CPF) to the left to NPF' and to CPF' from A to B with the consequence of a higher price level at P' and a lower output at Q'. Fighting against stagflation through monetary expansion (ML') would increase price inflation to P" at point C. The way out of the slump is through strengthening the factors of production in order to move the economy back to Q* again.

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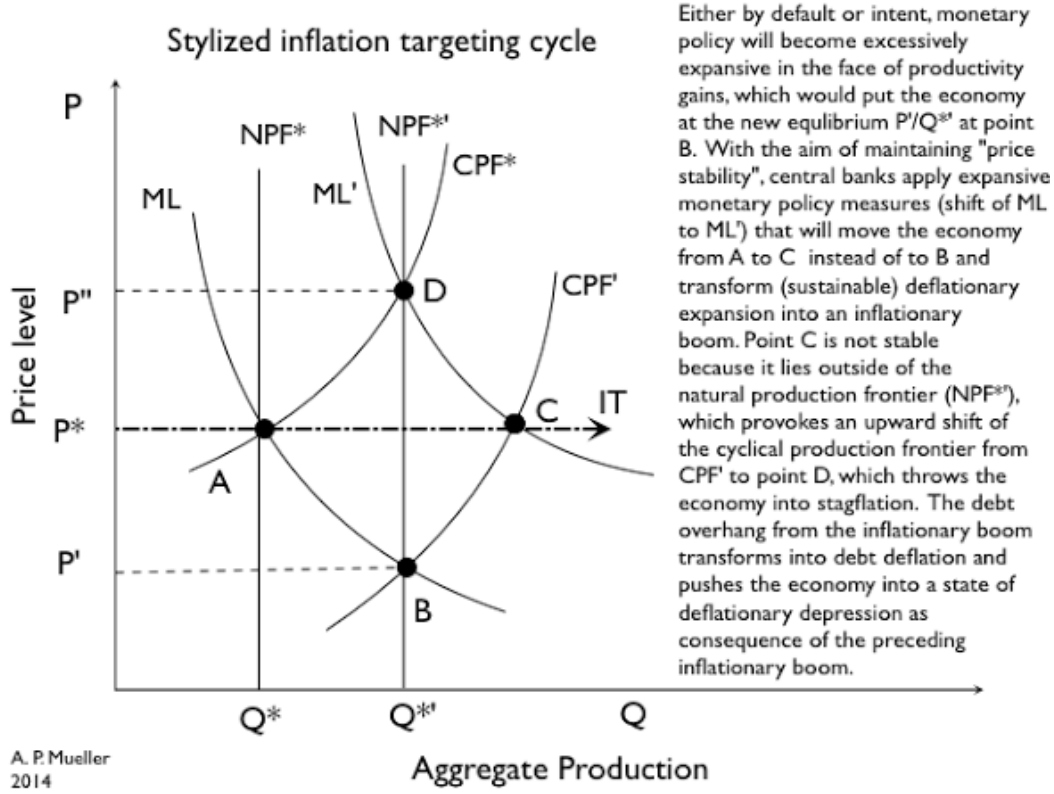

Either by default or intent, monetary policy will become excessively expansive in the face of productivity gains, which would put the economy at the new equlibrium P'/Q*' at point B. With the aim of maintaining "price stability", central banks apply expansive monetary policy measures (shift of ML to ML') that will move the economy from A to C instead of to B and transform (sustainable) deflationary expansion into an inflationary boom. Point C is not stable because it lies outside of the natural production frontier (NPF*'), which provokes an upward shift of the cyclical production frontier from CPF' to point D, which throws the economy into stagflation. The debt overhang from the inflationary boom transforms into debt deflation and pushes the economy into a state of deflationary depression as consequence of the preceding inflationary boom.

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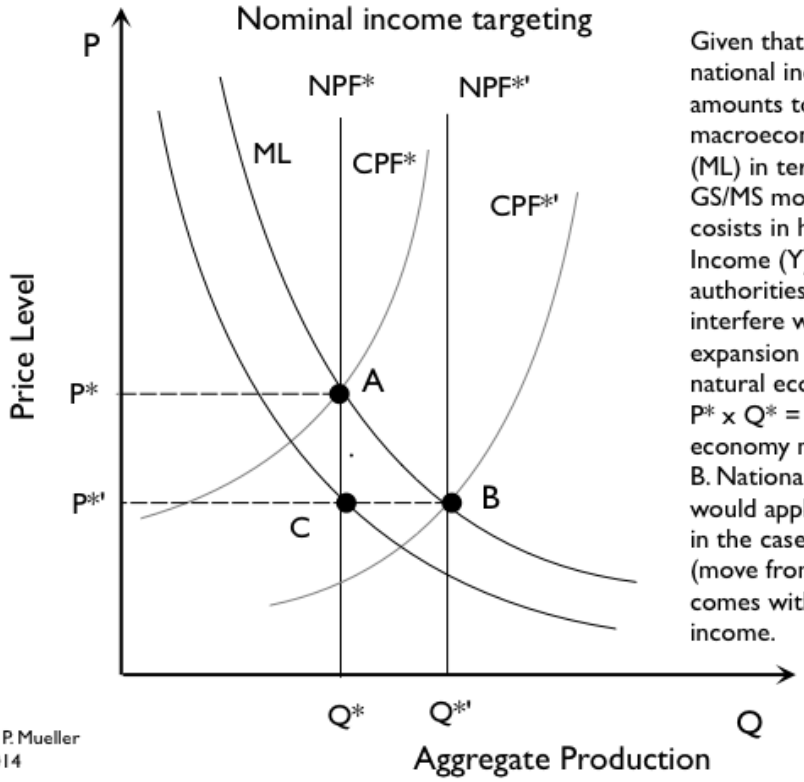

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Given that MV = QP = Y, national income targeting amounts to targeting macroeconomic liquidity (ML) in terms of the GS/MS model. If the aim cosists in holding national Income (Y) steady, monetary authorities would not interfere with a deflationary expansion because with natural economic growth P* x Q* = P*' x Q*' as the economy moves from A to B. National income targeting would apply expansive measures in the case of a liquidity crunch (move from A or B to C) that comes with shrinking national income.